



DUPLEX GUIDED INFRA INGUINAL INTERVENTION IN RENAL COMPROMISE PATIENTS A NOVEL TECHNIQUE

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Abstract : The advent of Endovascular surgery has resulted in a dramatic shift in treatment of patients with peripheral vascular disease. The advantages are minimal invasion, no scalpel anaesthesia, early recovery, resumption of functional status and good technical success. Nevertheless, endovascular technique is associated with morbid complications such as Contrast Induced Nephropathy to the patients and Radiation hazard to the surgical team performing it. Considering these two problems, a new novel technique of total endovascular solution under Duplex Ultrasound guidance was considered. The major advantages included minimal invasion, no use of contrast, no radiation hazard, anatomic and hemodynamic assessment of technical success. Duplex ultrasound has the additional advantage of ease of availability, economy and accessibility.

Keyword : Duplex ultrasound, Contrast induced Nephropathy, Peak systolic velocity, End diastolic velocity, Velocity ratio

INTRODUCTION:

Duplex ultrasound mapping of the infrainguinal arterial tree has shown to be reliable alternative to contrast arteriography in planning interventions. This method is particularly advantageous for patients with chronic renal failure, diabetes mellitus that may predispose them to an increased risk of developing contrast induced renal failure. The severity of clinical manifestation ranges from a mild reversible rise in serum creatinine to End stage renal failure and death. Acute renal insufficiency may develop in 31 % of diabetic patients who undergo contrast imaging. Similarly 62 % of patients with pre existing renal insufficiency (Sr.Creat > 2mg/dl) may experience deterioration of their renal function and up to 20 % of these patients may require permanent dialysis. More over 38 % of diabetic population with azotemia may develop contrast induced nephropathy. In the hands of an expert, infra inguinal arterial tree can be accurately mapped. The newer generation duplex ultrasound machines deliver high quality images of the arterial tree and reliable hemodynamic parameters of the infrainguinal system.

The driving force for such arterial interventions is borrowed from growing expertise in using Duplex for interventions during venous ablation, IVC filter deployment and treatment of femoral artery pseudo aneurysm by duplex guided compression and thrombin injection.

CASE REPORT:

A 72 year old male patient presented to our institute with complaints of non healing ulcer over left foot since 2 months. His sleep was disturbed due to pain. He was a coolie by occupation. He gives history of smoking 20 beedis / day for the past 50 years. He is a diabetic 15 years and has been on medications. He had an episode of acute myocardial infarction 4 years ago and has been on medications. No history of CVA in the past. His vital statistics were normal and general physical examination revealed no signs of acute systemic illness.

On Examination of left lower limb he was found to have normal left femoral artery pulse, feeble popliteal artery pulses and absent distal pulses. His foot was cold and there was an ischemic patch of size 3 * 3 cm over the dorsum of left foot with oedema up to ankle. His opposite limb pulses were normally felt up to popliteal fossa and feeble at the ankle. His upper limb pulses were normal. Ankle brachial index on the left side was 0.35, and right side was 0.86. 2D echocardiogram – Hypokinesia of lower third IVS, EF – 45 %, No clots / PE ECG all leads - Sinus tachycardia.

Ultrasound abdomen – Minimal free fluid in the abdomen, Bilateral Medical Renal disease.

Renal function – BUN: 68, Sr.Creat: 2.1, Na: 147, K: 4.1

Complete blood count: Hb: 9.8, TC: 8700, Plt: 2.3 lac

FBS: 186, PPBS: 213, HbA1C – 8.7

Fasting lipid profile – T.Chol: 246, HDL – 48, TGL - 163

Duplex ultrasound for his lower limb artery was done:

Contrast imaging could be done due to his co existing renal failure. Hence with the available information, we prepared this patient for an endovascular intervention to salvage his limb. Adequate hydration on the preop day, epidural analgesia for pain relief, Loading dose of tab clopilet 325 mg and parenteral antibiotic and anticoagulants were initiated.

PROCEDURE:

We used Aesote My lab 25 portable Duplex ultrasound machine with a 5 – 7 MHz linear probe for imaging the vessels. Procedure was performed under local anaesthesia. Ipsilateral common femoral artery puncture under ultrasound guidance was made and 6 fr access sheath was introduced into the superficial femoral artery. Systemic heparinization was done as per routine. A '035 inch Terumo guide wire was used to negotiate through the lesion and a 5 Fr multipurpose catheter was used to support the wire. The entire procedure was done through true lumen which was confirmed by free flow of the wire and back bleed on aspiration through the catheter. Once the lesion was identified and wire was crossed, the catheter was exchanged for an appropriately sized balloon. Balloon angioplasty of the lesion was done and hemodynamic across the lesion was measured. Flow limiting lesions, intimal flaps, resistant Lesions were identified. Technical success is defined by less than 30 % residual stenosis and PSV ratio < 2. This could not be achieved with a plain balloon plasty and hence a self expanding metallic stent was deployed.

OUTCOME:

Technical success was confirmed by completion colour duplex and spectral analysis which showed triphasic waveform across and beyond the stented segment and no residual lesions/ intimal flaps. Post procedure Ankle brachial index was 0.85 on the left side with a palpable posterior tibial artery pulse. Patient was relieved from rest pain. The foot turned warm and there was brisk bleeding while debriding the ulcer. Patient was put on dual antiplatelets, statins, antibiotics and his other regular medications. He was discharged on Post op day 2. He was readmitted after a week for skin grafting. His limb was salvaged successfully.

DISCUSSION:

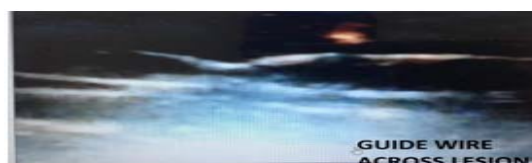
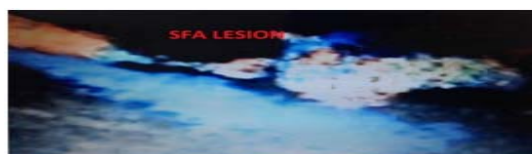
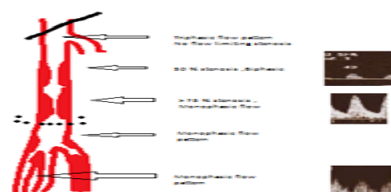
Duplex ultrasound imaging has been an essential tool in evaluating patients with peripheral vascular disease. It has been successfully used during endovenous ablation, placement of IVC filters, obtaining vascular access, treating pseudo aneurysms by compression therapy and thrombin injection. This expertise has been used to the advantage to perform angioplasty for peripheral arterial disease.

The major advantages are:

Accurate puncture of Common Femoral artery and negotiating wire into the Superficial Femoral artery Anatomical localisation and hemodynamics across the lesions Enabling passage of the guide wire through the true lumen with continuous monitoring of the wire tip until its parked safely beyond the lesion Selection of the appropriate size balloon and stent by precise measurement of the vessel B Mode and spectral analysis were performed to ensure adequacy of the procedure. The risk of contrast administration has been completely eliminated and there is no exposure to radiation, thus making this procedure safe for the patient and the surgical team performing it.

SUMMARY:

Duplex guided interventions may become an important alternative to the vascular and endovascular surgeons who are frequently exposed to radiation. The deleterious effects of radiation are cumulative and permanent. The risk of contrast administration in elderly diabetic patients with co existing renal insufficiency is well documented in literature. Duplex guided intervention for Infra inguinal disease has been performed only in very few centres all over the world thus making such interventions a part of new revolution. Endovascular treatment of infra inguinal disease can effectively be performed under Duplex ultrasound guidance that completely eliminates the use of contrast and radiation exposure.



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